**Airea: Arts and Interdisciplinary Research**

DOI: https://doi.org/10.2218/airea.5044
**www.journals.ed.ac.uk/airea**

ARTICLE

# Embodied Complexity in Choral Singing

Daniel Galbreath [a]

Amateur musical ensembles draw participants from widely varying disciplines into shared artistic activity in a way that few other artforms do; in particular, choral music, in which bodies both create and directly receive sound, raises profound questions of how performers' uniquely embodied creative approaches interact. Amateur choral singing therefore offers a lens into how musical creativity is distributed among, and emergent from, a diverse group of individuals. This article explores how the performance of indeterminate and improvisatory choral works offers a powerful example of this distributed creative agency via a network of sounding bodies.

This article centres on a case study (March–October 2017) involving three British amateur choirs in the performance of improvisatory choral scores by Kerry Andrew (2005) and Cornelius Cardew (1968–70). Complexity Theory (Davis and Sumara 2006) offers a useful framework for understanding how creative impulses and constructions interact; both the vocal expression and corporeal receipt of these creative ideas occurs in an embodied way, drawing on dance and embodiment theory (Sheets-Johnstone 2009, Downey 2002). The research process and qualitative-data-processing methodology (Charmaz 2014) of the case study are described, before findings are laid out with a view to how they point towards ideas of embodied, complex interaction. These findings offer an important, and hitherto unexplored, view into how Complexity Theory (a common theoretical framework in other fields across the sciences and humanities) might usefully describe musical performance. In transcending attempts to atomise ensemble interaction according to shared intellectual knowledge and verbal communication, the complex, embodied interaction of diverse singers, through the physical connection of sound, might involve those singers in the distributed authorship of a musical work.

Keywords: Choral music, aleatorism, Complexity, embodiment

## Introduction

Interdisciplinarity can occur in music-making in different ways. Most obviously, the outcome of a creative, collaborative process can be dictated by the interaction of disciplines, brought to bear on that outcome through the contributions of participants. However, situations where the outcome is predetermined – performing a composed musical work, for instance – but where participants' varying backgrounds and experiences exert a pull on how that outcome is realised can also be seen as interdisciplinary. In amateur music making, for instance, common frameworks of musical understanding may not be shared consistently across the ensemble; they may even be absent altogether. The teacher, the solicitor, and the engineer will each bring unique epistemologies and approaches to the ensemble, directed by their own training, background, and lived experience. In amateur music-making, shared musical knowledge (how the ensemble collectively 'constructs' and performs the piece) emerges from this interaction of disciplinary backgrounds. Using music-making by amateur choirs, this article explores how

[a] *Daniel Galbreath, Royal Birmingham Conservatoire, Birmingham City University, danielgalbreath@gmail.com*

the performance of aleatory choral works offers a powerful example of distributed creative agency via an interconnected network of sounding bodies. This view broadens the concept of interdisciplinarity considerably, but, rather than weakening the term by loosening its specificity, it offers a reconsideration of how musical knowledge is created and shared: not just through conversation and conceptual knowledge exchanges, but also via the embodied experience of sound.

To make this argument, I focus here on a case study with amateur singers performing aleatory choral music. Over the course of three workshops with amateur choirs in the UK (March–October 2017), I led singers in a short warm-up, then in the performance of two works that contained aleatory elements: Kerry Andrew's *O Nata Lux* (2005) and Cornelius Cardew's *The Great Learning*, Paragraph 7 (1968–70). Singers were then asked to reflect on their experiences of performing these works. 'Performance', in this case, simply means to realise live within the workshop. 'Aleatory' is used here to refer to musical textures in which the performers are asked to assume creative, improvisatory freedom, often with timing, pitching, or text[1]. The amateur performers came from widely varying backgrounds, and performing aleatory works naturally offered scope for their subjective, creative approaches to bear on a common goal in a way that performing fully notated music might not. Choral performance is of interest because it sheds strong light on how sound creates physical interaction among participants. Instrumental and vocal music-making are undeniably embodied and relational, but choral music offers a particularly clear view of the unmediated physical force of sound, created and received directly by bodies. It is the shared, acculturative experience of those bodies singing together which generates collective musical knowledge across the divide of amateurs' various backgrounds. By contrast, professional-level ensembles more probably consist of members who rely on a shared basis of common musical training in their musical interactions. Amateur performance of aleatory choral scores is therefore an extremely niche situation: there are more likely to be differences between participants' musical knowledge and backgrounds, those different perspectives are actively performed in improvisatory repertoire, and performers' subjectivity is realised and communicated in a clearly embodied way.

The nature and outcomes of this musical interaction can be described using Complexity Theory, a body of thought that has gained currency in other fields ranging from neuroscience to educational theory, but which has not yet made a significant mark on musical thinking[2]. Complexity Theory deals with the unpredictable outcomes of a system, born of the interaction of its component parts; it refutes more deterministic or mechanistic discourses. In transcending attempts to atomise ensemble interaction according to common intellectual knowledge and verbal communication, I propose that the complex, embodied interaction of diverse singers, occurring via the physical connection of sound, might involve those singers in distributed, yet shared, musical creativity. This proposal points towards a concept of 'embodied complexity' by bringing embodiment theory into dialogue with Complexity Theory, a conversation that will be led by the singers themselves.

## Case Study Design and Methodology

This case study was part of a larger project, supported by Royal Birmingham Conservatoire (Birmingham City University), that investigated singers' experiences of choral and vocal-ensemble aleatory performance[3]. The phase of research encompassed by this case study was concerned with how various factors influenced each singers'

[1] I will not rehearse here the semantic issue of 'aleatory' versus 'indeterminacy' versus 'improvisation' or 'improvisatory'. Different writers have delineated these terms in many different ways. I rely on 'aleatory' simply because its etymology encapsulates both play and players, and this project is concerned with those players and the way they play the 'game' of aleatorism. Although the adjectival 'aleatoric' and its derivatives are commonly used, I follow Paul Griffith's comment in the *New Grove Dictionary* that these are the product of an "etymological distortion" (Griffiths 2001).

[2] Notable exceptions include Tom Davis's article on the use of Complexity in musical composition (Davis 2010, 137–46) and, most notably, David Borgo's related work in cybernetics and improvisation (Borgo 2016, 113–30).

[3] Much of the material for this article is drawn from my PhD thesis (Galbreath 2019).

 

decision making – and, consequently, the ensemble's collective decision making – while also focusing on the embodied dimension of improvisatory ensemble singing. This focus resulted from my own experience as a choral singer, conductor, and researcher: the larger study enabled participants to steer me towards these concerns.

This case study consisted of three 30–45-minute workshops, each fitted into the different amateur choir's regular rehearsal. These workshops involved singers in a type of choral singing that was likely unfamiliar to them: therefore, in addition to offering an opportunity for me to gather data, the exploration of new, improvisatory warm-ups and unfamiliar pieces provided a novel and potentially interesting experience for the choirs. During the workshops, singers were introduced to the term 'aleatorism' through a basic definition and a frame of reference, including mention of works using aleatorism with which they might be familiar, such as *Cloudburst* by Eric Whitacre. This approach helped ensure that the event might feel relevant for the singers, who were allowing me to deprive them of valuable rehearsal time designated for their other programmed repertoire. As such, it was necessary to be flexible in timings, occasionally speeding up or truncating particular steps.

Further details about the participating ensembles are summarised in Table 1, below[4]. The column on the far right indicates the abbreviations that will be used for the remainder of this chapter to refer to both the choir and the workshop in which they participated. To reinforce the groundedness of conclusions in singers' responses, quoted responses are cited with these codes, along with the number they were randomly assigned (so, QCC3 is a singer from Quinton Community Choir to whom I had assigned the number 3):

| **Choir Name** | **Location of Event** | **Date** | **Reference Abbreviation** |
|---|---|---|---|
| Quinton Community Choir | St Boniface Church, Quinton, Birmingham | 6 March 2017 | QCC |
| Civil Service Choir | DEFRA, Nobel House, London | 18 March 2017 | CSC |
| Ex Urbe Choir | Fentham Hall, Hampton-in-Arden, Warwickshire | 29 October 2017 | EUC |

Table 1: Choral aleatorism workshops with amateur choirs
*Source: generated by the author*

In each workshop, the singers were led through a warm-up routine that explored explicitly the physical nature of singing[5]. This warm-up comprises successive breathing and vocal exercises, encouraging body awareness and requiring each individual to improvise sounds independently. Due to shortness of time and a strong physical warm-up from their regular conductor, this portion of my own warm-up was excluded from the QCC workshop. Singers in all three workshops were then invited to walk freely around the rehearsal space, making eye contact with colleagues and avoiding predictable walking patterns. They were asked to choose a sound to sustain or repeat; while walking, they were instructed to try swapping that sound with anyone with whom they made eye contact. This exercise aimed not only to make the singers aware of their whole bodies' role in producing sound, but also to make them more aware of their colleagues.

We then briefly rehearsed and performed two pieces using choral aleatorism: Kerry Andrew's *O Nata Lux* (Figure 1) and Cornelius Cardew's *The Great Learning* (Figure 2).

[4] The musical and administrative leadership of all choirs have assented for these choirs to be named in print.
[5] This warm-up is detailed further in publications co-authored with Gavin Thatcher (Thatcher and Galbreath 2017, Thatcher and Galbreath 2019).

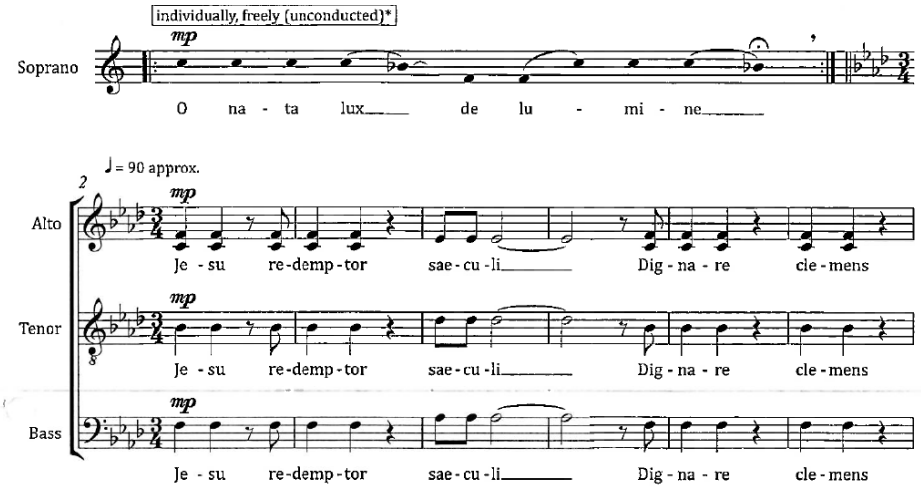


Figure 1: Kerry Andrew, *O Nata Lux* (2005)
*Source: Kerry Andrew, O Nata Lux (unpublished, 2005). Score extract reproduced with the permission of the composer*

*O Nata Lux* requires each soprano to sing the same written melody independently, while the rest of the choir sings homophonically. At the end, the altos and tenors oscillate freely between two notes, the basses hold a pitch, and the sopranos sing a new line, still independently. For each workshop, I led the sopranos in learning their part first, allowing them to perform their melody in unison before singing it independently. Independent singing often required encouragement, even the cueing of individual singers. It was sufficient here for singers of the non-aleatory lines to sight-read their parts, so the choir then simply performed the entire score.

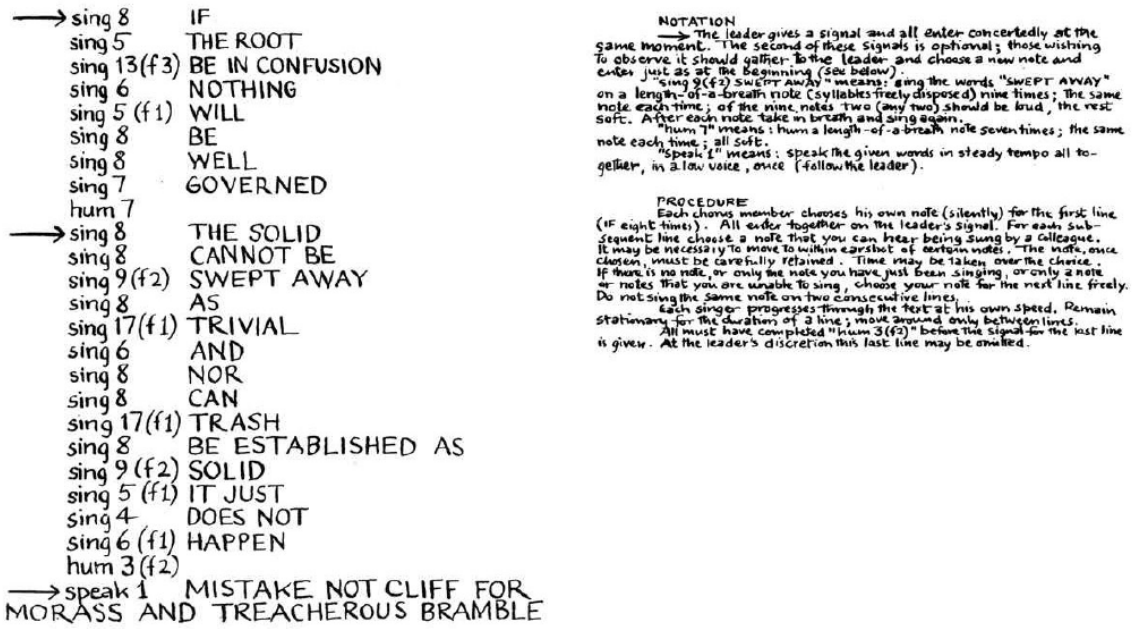


Figure 2: Cornelius Cardew, *The Great Learning,* Paragraph 7 (1968–70)
*Source: Cornelius Cardew, The Great Learning (London: Horace Cardew/Danny Dark Records, 1968–70), Paragraph 7. Score extract reproduced with the permission of Danny Dark Records*

Before performing *The Great Learning*, for reasons of efficiency I opted to provide a verbal explanation of the score's instructions (visible in Figure 2, above); these instructions carefully matched the score text which they summarised, although inevitably they elicited questions seeking clarification. I then asked singers to choose a pitch on which to begin, and verbally initiated a performance. In all three workshops, despite my instruction to stand in place and only move about the room in order to hear, and align to, a new pitch, singers unexpectedly decided to walk around continuously. This occurrence exposes a potential shortcoming of preceding this piece with the warm-up routine as described, and possibly a lack of clarity in my verbal instructions.

Data were collected by questionnaire. In these questionnaires, singers were asked about their musical backgrounds. Then, as per the objectives of this phase of study, they were given space to reflect, in writing, on the following questions:

> *What are some general impressions you have after the workshop?*
>
> *Please pick 3 or 4 moments where you were aware of making a decision (of any kind) during these pieces; who or what influenced your decision?*
>
> *Please tell me about how you felt physically during these performances. How did it feel to sing the works? How did it feel in relation to others in the room? To the sounds you experienced?*

The second and third workshops were timed to give participants an opportunity to fill out the questionnaire on site, guaranteeing a healthy number of responses. From the three choirs, there were 59 total responses, a majority coming from CSC, the largest of the three ensembles. Respondents ranged in age from 28 to 66; approximately 64% of those who chose to specify gender identified as female. Levels of experience ranged from those who learned by rote to one singer with a master's degree in vocal performance. Many participants sang in other choirs and/or had backgrounds as instrumentalists; several had some experience as vocal soloists. This variety among singers' backgrounds is compounded by the different approaches of the three choirs. QCC focuses primarily on learning non-classical repertoire by rote; CSC and EUC both focus on relatively challenging classical fare, but since EUC is a chamber choir and CSC a much larger group, their repertoire selections tend to differ accordingly. No information about singers' past engagement with choral aleatorism or improvisation was gathered, but responses generally suggested little to no such experience. Therefore, an additional layer of shared musical knowledge was absent: aleatorism required the amateur ensembles to generate new musical understanding collaboratively on site.

Singers' answers to these questions were processed using the Grounded Theory Method, through which data were coded and theorised in a way that kept findings firmly grounded in the qualitative responses from which they emerged. This use of Grounded Theory Method adhered most closely to the constructivist approach of Kathy Charmaz (Charmaz 2014), whose stance is that theory formation is "a social construction of the social constructions found and explicated in the data" (quoted in Laws and McLeod 2014, 10). Small segments of qualitative data were coded with a view to "describing, classifying and connecting" the information at hand (Urquhart 2001, 111). These codes then coalesced into categories of findings. This study yielded categories which centred on themes of enjoyment of novelty and improvisatory freedom; feelings of unsettledness at the lack of traditional structure; heightened awareness of the group, its collective sound, and prominent individual members within it; physical sensations that were different from what was expected; and greater physical awareness of the sound and the acoustic space.

Grounded coding usefully addresses my dual role as conductor and researcher. Line-by-line coding ('open coding') prevents the researcher from "'going native', or from becoming so immersed in respondents' categories or

 

worldview that one fails to look at one's data critically and analytically" (Charmaz 1996, 39). Coding the data in small, parsed segments helped to dislodge certain entrenched assumptions and expectations that I held as a conductor. And indeed, the categories into which that coded data coalesced affirmed the gap between my expectations and singers' experiences. For instance, while I expected that creative decision-making would benefit from formal musical training, these singers showed a consistent capacity for both creating and disrupting musical patterns using a diversity of approaches. Additionally, the intuitive clarity with which the singers contributed to the category titled 'feeling others and the space through sound' seems likely to be a result of these amateur singers' divergent backgrounds. These unexpected categories reemphasise the importance of the methodology used, and strongly direct grounded theorisation towards interaction with key tenets of Complexity Theory.

## Complexity Theory

As practice-research progressed, Complexity Theory arose as field that could usefully enrich inductive, grounded findings. Since Complexity Theory is itself largely to do with practice – it is often presented in the context of practice-research – and with the interaction of often disparate, specialised participants (Davis and Sumara 2006, 137–8), it engages usefully in discourse with singers' responses in this case study. Built on the work of physical chemist Ilya Prigogine (1917–2003), Complexity Theory derives from the idea that phenomena emerge out of the interactions of agents in a way that cannot be deterministically predicted.[6] Its recent use within educational research[7] offers considerable potential for understanding group musical practice, especially when musical outcomes are as actively constructed by participants as in this case study. Complexity Theory can help elucidate the constructions occurring during aleatorism, rather than acting as a deductive descriptor. Indeed, Lesley Kuhn prefers the term 'Complexity Thinking' to 'Complexity Theory' and considers it a "style of thinking or a paradigmatic approach" rather than a testable assertion (Kuhn 2008, 170). I follow Kuhn's approach, although I will rely simply on 'Complexity' hereafter. It is most helpfully enlisted as an orientation that "does not *rise over*, but *arises among* other discourses" (Davis and Sumara 2006, 8). It therefore supports the inductive mode used here, as it affords tools to guide thinking rather than "imposing verdicts" (Kuhn 2008, 173). Moreover, it offers flexibility to frame the approaches and reflections of singers from varying backgrounds, as in this study.

Complex systems are not mechanised – they are not born of the stable responses of their agents. They are described as indeterminate and resemble more closely clouds than "finite and predictable" clocks (Radford 2008, 143–4). They exist in a state of imbalance, which yields change and adaptability; the inherent self-organisation of the system, born of spontaneous interactions of "autonomous agents," is what brings larger patterns of change (Davis and Suamara 2006, xi). Such change is described as being "emergent" (Davis and Sumara 2006, xi), meaning that its source is 'within' the system, and that it results from the behaviour and interactions of the system's agents. Emergence is facilitated by proximity: agents within the system interact at close range, and those interactions might ramify and become patterns of behaviour. Emergence and proximity are the two key tenets of Complexity around which the findings of this case study are represented, and this presentation is necessarily somewhat artificial. Complexity is, unsurprisingly, a complex network of thoughts and approaches. Moreover, the relatively rich body of data at hand produces equally complex outcomes, which do not all fit neatly into discussions of emergence and proximity. This limited approach is taken deliberately to introduce core principals of a body of thought that can offer much to our understanding of musical performance. It also reveals how the use of Complexity to understand

[6] Complexity contrasts from "hyper-complication," or high levels of mechanistic – and therefore still predictable – complication (Alhadeff-Jones 2008, 73).
[7] For instance, see Cohen, Manion, and Morrison 2011.

 

performance resulted from singers' re-constructions of, and reflections on, their own experiences of performing choral aleatorism.

## Emergence: Common Purpose and Community

Emergent outcomes cannot be predicted (Hetherington 2013, 73). Complexity argues

> against the linear, deterministic, patterned, universalisable, stable, atomised, modernistic, objective, mechanist, controlled, closed systems of law-like behaviour which may be operating in the laboratory but which do not operate in the social world (Cohen, Manion, and Morrison 2011, 29).

of, in this case, music-making. Michel Alhadeff-Jones writes that the components of a complex situation are ordered, in that they are closely linked and can cultivate an internal logic, but are also disordered because they "evolve and vary according to some forms of inequality, agitation, turbulence, chance encounter, rupture, catastrophe, fluctuation, instability, disequilibrium, diffusion, dispersion, etc." (Alhadeff-Jones 2012, 29). This balance between order and disorder was thematic among singers' responses in this case study. Some felt liberated, the absence of strictures leaving room for them to contribute their own unique voicing: "[i]t's good to be able to make a noise in a completely non-judged space. Even my own judgment was suspended" (CSC18). Others felt challenged or unmoored by the lack of notational rigidity or clear leadership. What for one singer provided a "sense of novelty, of having taken part in/experienced something quite new" (CSC31), for another offered less of a "sense of achievement" than singing "what's on the page" (CSC32), presumably referring to more traditional scoring. These responses expose a gap that must be filled when the preordained internal logic of traditionally scored material is absent, especially when performers' shared musical knowledge is not as consistent as it might be among trained singers. Among these amateur singers, any new internal logic that emerges is less likely to rely on common, supplementary musical training: divergent musical backgrounds mean that the internal logic of shared, acculturated musical experience is particularly disrupted by the "instability, disequilibrium, diffusion, [and] dispersion" of singers drawn from widely varying backgrounds (Alhadeff-Jones 2012, 29).

Complexity proposes that that internal logic emerges 'autocatalytically' from the interplay between stability and disruption. 'Autocatalytic' describes a system which is self-defining; change within that system results from internal interactions as the emergent function of autocatalysis. In a situation with clear authority figures, such as a workshop leader, and authors, such as a composer, this autocatalytic emergence is arguably less palpable. Yet autocatalysis might still occur from within any ensemble: interactions among singers are still responsible for much of the nature of performance, especially in improvisatory music. Autocatalytic scenarios are those in which there is a self-defining system which is nevertheless not *systematised*. They capitalise on "collective intelligence," but avoid the dangers of 'mob mentality' by eschewing the hegemony of consensus (Davis and Sumara 2006, 84). As one singer put it, "I enjoyed the Cardew piece, the sense of all sharing a common purpose while largely dictating our own contribution" (CSC37). Common purpose replaces consensus, and becomes an internal logic cultivated by the individual contributions of diverse singers. The contributions of agents both mutually influence each other (Davis and Sumara 2006, 11) and feed into group behaviour which itself influences individuals' behaviour Cohen, Manion, and Morrison 2011, 28) – reciprocity operating on multiple levels. Another singer reflected on how they contributed to a community: the workshop "was a bit weird, but great fun, and I felt for some of us that it was a great way to celebrate community" (QCC2). At the same time, they revealed the community's resistance to a "mob mentality" in noting that many singers visibly resisted the unorthodoxy of the experience (QCC2). It is notable that many singers' responses, exemplified by the quotations above, were as concerned with the situation's emergent community as with any emergent musical knowledge or patterns. For educational theorists Brent Davis and Dennis

 

Sumara, the site of learning is "the *individual-and-environment* as [a] dynamic unity" (Davis and Sumara 2006, 119) The singers created, observed, and learned from their environment-community, which factored significantly into how they managed these unfamiliar pieces.

Complexity's attention to the distribution of creative drive in performance reveals the importance of shared complicity: "[J]ust as learning is distributed, so is *authorship*" (Davis and Sumara 2006, 145). Authorship, or even authority, tended to emerge from participants with more confidence and training. Singers perceived, and responded to, leaders that were both established – specifically, a conductor or workshop leader (me) – or emergent – other singers who gained 'control' through the strength of their voices. This finding suggests an imbalance in the input of participants from non-musical backgrounds. Yet even leadership is just another layer of a larger complex system of learning, a notion that is no less important for seeming facile. Emergent leadership was highly contingent on the vocal corroboration of other singers across the spectrum of levels of musical training. The emergent nature of power and leadership binds it to the complex interactions within a system.

Another important dimension of shared creative imperative, distributed among participants with diverse backgrounds, was disruption. The discussion thus far might suggest an overall will among singers to conform. This tendency could be seen as a result of the musically conservative backgrounds typical of these amateur singers. Yet such a notion is unseated by the considerable frequency of questionnaire responses which revealed a penchant for disruption. Singers consistently sought disruptive freedom, and justified their disruptions on subjective, creative grounds rather than framing them according to adherence to the 'rules' of the improvisatory pieces at hand. A few singers took the music's improvisatory freedom as license to alter processes or even ignore the score's instructions altogether. Most, however, embraced their creative agency in the context of their 'common purpose': they eschewed rhythmic homogeneity, actively sought dissonance, and broke patterns of movement around the room (in both the warm-up and the Cardew piece).

Emergent leadership impelled new behaviours by motivating resistance as much as it provided a point of unification. Several singers worked actively to resist the influence of emergent leaders or patterns in deciding on their next pitch in the Cardew piece, some using more formal musical knowledge, others relying more on subjective intuition. One singer – a soprano – recalled resisting a loud section-mate in the Andrew score to avoid creating a "bloc" (CSC29), a view echoed in other responses. Avoiding tonal compliance was a common factor in deciding on pitches. Strategies for achieving or emphasising dissonance included deliberately moving towards discords by semitone (CSC27), accentuating dissonances by making them coincide with the *forte* lines in the Cardew piece (QCC5), and walking in a different direction while picking a dissonant note (CSC2). This disruptive agency was vital to many singers' co-creativity in performing choral aleatorism, and in interacting with the community they had created: "You feel like you need to be different, not matching up with people, whereas randomness will inherently bring people together', posited one singer" (CSC38).

The association here of voice with community, leadership, and power 'blocs' suggest that sound may be perceived by singers as a manifestation of an ensemble's structures. Many singers experienced greater aural awareness of other individuals in the space, and this heightened level of listening resulted, in one singer's words, in "conformity through interaction with others, rather than by following formal rules" (CSC3). So, as Alhadeff-Jones observed, the system had an internal, autocatalytic logic, built with tools that the singers had acquired from their individual backgrounds. Yet sound, as seen in the preceding discussion, also brought about "agitation, turbulence, chance encounter," and other forms of disruption (Alhadeff-Jones 2012, 29). Sound, as the fuel of emergence, is a crucial means through which proximity is established between singers.

 

## Proximity: *Feeling* the notes

Emergent patterns and behaviours result from proximal interactions among agents within a network of "short-range relationships", through which information is "exchanged among close neighbours" (Davis and Sumara 2006, xi). Naturally, proximity has most obviously to do with geographical nearness among members of the ensemble. One singer wrote of sometimes moving, during the Cardew score, "away from the core tonality," while at other times they "felt like confirming – I think it was dependent on whether I was being drowned out by others" (CSC4). This singer's expression of a balance between freedom and conformity is subtly related to the physical immanence of sound. Others spoke more plainly of their use of physical space to find new notes, or to remove themselves from emergent systems.

Connections in complex systems occur at all levels and are contingent on commonalities among members beyond physical proximity (Cohen, Manion, and Morrison 2011, 29). Connectedness in a choral situation might occur between those of similar voice parts, perceptually bound by the acoustics of tessitura and timbre, or between those to whom the score assigns similar processes at similar times. Several singers based their improvisatory decisions on a sense of personal comfort with others, reaffirming the importance of community-building among the ensemble. Many singers recalled responding, especially while performing the Cardew score, not only to geographically proximate voices, but also to those on 'nearby' timbres, words, pitches, or ranges. Two singers noticed soprano pitches as the most aurally obvious and responded to them accordingly (CSC28 and EUC13). Several singers listened broadly to the ensemble's progress through the score, noticing when they fell out of pace. One singer deliberately, physically exploited this timing slippage: "I felt conscious of others being further along in the piece than me, and noticed I started to expend my breath quicker to catch up – and then consciously relaxed this" (EUC13). Timing and rhythm were frequently adapted or altered to disrupt emergent patterns, so that proximity catalysed productive disruption. One singer deliberately did the opposite of others around them in terms of speeding up or slowing down (QCC5). Others commented specifically on avoiding a rhythmic match with those near them. Another, who indicated that she was a soprano, echoed the comments about balance in timing decisions found in several responses, recalling that she had to decide "[w]hen to start the Kerry Andrew, and how to stay aware of others yet independent" (EUC9). Proximity had a vital role in the disruptive agency of these singers.

Patterns emerge through feedback between agents within a complex system; positive feedback "brings increasing returns" and "amplifies small changes" (Cohen, Manion, and Morrison 2011, 29). Whether or not a new musical idea impacted on the group's behaviour was a product of the decision-making of every individual in the ensemble – hence, in part, the focus on decision-making in this case study. One singer summarised the balance between individual and group decisions that several others had reflected on, writing that they felt "more aware both of the decisions I take whilst singing and more aware of those singing around me" (CSC29). Narrowing the focus to particular musical parameters, one singer (QCC2) observed that their pitching decisions were

> dependent on the body language of the person near me. If they appeared happy to be involved, or relatively confident in what they were doing, it was easier to approach them and listen for their note. There was also the factor of approaching those with whom I had a better relationship […] (QCC2).

In a situation where proximity is a matter of personal choice, and decision-making relies on divergent levels of training and experience, non-musical factors in creating proximity became particularly important. Feedback is not just the engine of emergent community among amateur singers; it is a product of it.

These communities might be mapped. Davis and Sumara summarise varieties of "network architectures" of complex systems according to how information is transmitted through "neighbour interactions" (Davis and Sumara

 

2006, 142). Different architectures have different levels of centralisation: high centralisation causes information to move rapidly, via a central hub, whereas denser webs with a mixture of strong and weak connections between neighbours allow for richer, if slower, information transmittal (Davis and Sumara 2006, 52). This latter, robust mixture of strong and weak connections particularly describes amateur aleatory choral performance, where the ability to assume leadership or take creative initiative may vary from singer to singer, and, for any given singer, from moment to moment. Additional weak links – between singers, or between a singer's individual processes and collective acts of construction – can imbue the system with strength from redundancy (Davis and Sumara 2006, 52)[8]. This richness is reinforced further by internal diversity and specialisation (Davis and Sumara 2006, 137–8): "Specialisation entails a balancing of individual obsession and collective necessity – that is, a balancing of internal diversity and internal redundancy" (Davis and Sumara 2006, 140). The internal diversity of creative voicing provided by a group of amateurs with mixed backgrounds offers a broad range of musical ideas which might grow into emergent patterns through positive feedback. Precisely which musical ideas gain momentum and catch on is arguably less foreseeable when the musical training of those involved is not consistent.

The interconnectedness, within each ensemble, created by sound was vital, and the amateur singers described this network using terms that did not rely on formal musical terminology. One singer wrote that the experience "[f]elt like making music – awareness of what I was singing in relation to sounds I was hearing as well" (EUC6). A singer from QCC observed that "it was strange to 'feel' the notes more than hear them. I could, of course, hear my pitch and compare it to others', but the sheer physical presence of the notes was quite different to normal singing" (QCC3). Many of the singers' reflections on sonic interconnectivity featured descriptions of their own corporeal experiences. One singer "[e]njoyed the vibrations in the room, [and] felt this through my […] chest particularly" (EUC9), while another was physically impacted by a broader, more ineffable sense of the experience: "By end of Cardew, I felt that my body was vibrating, but not just from the sounds I was creating" (EUC2). The physicality of sound was not always positive, however: with such variety in individuals' vocal timbres, some singers found certain voices offensive and moved away. This dislike of strong individual voices discussed by some participants was counterbalanced by others' interest in the music's distinctive capacity to reveal colleagues' unique voices. It was expected that some singers would discuss sound as a physical entity or force: I had asked them to turn their awareness to that possibility during the workshops. It was, however, notable how strong that impression was among many singers, and how widely varying these reflections were among different participants. Perceiving the group via its sound occurs, obviously, among any group of musicians. But I would conjecture that the importance, in decision-making and later reflection, of the physical-acoustic experience in shared choral creativity among the singers points to a means beyond discussion and instruction through which disparately-entrained creative bodies contribute to creative outcomes.

## Towards Embodied Complexity

The importance of these amateur singers' embodied interconnectedness via sound points towards a notion of embodied complexity. In this case study, proximal sound connected singers' creative bodies, and that physical-sonic interconnectivity yielded an emergent creativity that was distributed among diverse individuals, yet shared among the group. The agency-bearing, subjectively creative individual participant is at the heart of these dynamics; or, at least, the individual singer is the logical starting-point for considering embodied complexity. A by-product of the questionnaire methodology used here is that it offers individual reflections, from which the researcher must

[8] Davis and Sumara also deal with '*self-similar*' fractals, in which relationship patterns on all levels are similar, according to a fractal pattern. This idea, though interesting on a larger scale, does not readily apply to choral rehearsals (Davis and Sumara 2006, 43–4, 51–2).

 

surmise group dynamics. More importantly, however, I am more committed to understanding the lived experiences of singers than imposing any meta-narrative of emergent 'groupthink'.

Singers' primary form of developing their own creative agency within the emergent musical 'community' was via their voices. Theatre-maker Gavin Thatcher and I have argued elsewhere that to sing is to move via the voice, in a manner not dissimilar to dance – and, in this case, improvised dance (Thatcher and Galbreath 2019, 359). Dancer and theorist Maxine Sheets-Johnstone suggests that we come to understand ourselves and our context not through externally imposed, "third-person" understandings of our embodied experience but instead through our own "first-person" experience (Sheets-Johnstone 2009, 19–20). Using this line of thinking, the singers understand the music by creatively moving through it, in a sense, with their body-voices. This first-person discovery also entails the discovery of fellow performers: Sheets-Johnstone observes that "[t]he world that I and other dancers are together exploring is inseparable from the world we are together creating" (Sheets-Johnstone 2009, 31), just as singers in this case study simultaneously created and came to understand a community.

The voice exists and operates between bodies. The field of voice studies, beginning with the work of Roland Barthes and appearing more recently in volumes such as Konstantinos Thomaidis' and Ben MacPhersons' *Voice Studies* (Thomaidis and MacPherson 2015) postulates the voice as an "in-between," a place where one body might be perceptible to another body (Thomaidis and MacPherson 2015, 4–5). In *Music and Embodied Cognition*, Arnie Cox argues that our bodies respond to music we hear in a physical way (Cox 2016). We perceive the physical efforts behind sounds[9], and infer a musical agent when we respond mimetically to music that we hear (Cox 2016, 143). Singers in this case study would perceive an agentive, creative body behind the sounds they experience and empathise with it as they move with their own voices. Thatcher and I have attempted to push Cox's notion further, suggesting that "bodies experience vocal sound both by creating and receiving it" (Thatcher and Galbreath 2019, 353). Vocal sound might therefore create a form of actual physical contact between singers (Thatcher and Galbreath 2019, 353). If this further argument is accepted, then as the singers in this case study created communities, they did so with each other in a physical way, relying on relational embodied cognition rather than codified musical training.

As sound connected singers to the group, the sonic experience of the group impacted on singers. Greg Downey puts forth a notion, based on his study of Afro-Brazilian *capoeira*, which he terms "the body's apprenticeship in listening" (Downey 2002, 487–509). Downey observes that "[m]usic emerges in a field of corporeal potential rather than in a cognitive space"; bodies are "trained" by the sound at hand (Downey 2002, 499), as, in this case study, singers responded physically and creatively to the overall sound in the workshop. Downey highlights the importance of what I have described as disruption: within the "field of corporeal potential," musical traditions are reflected in a performer's behaviour, from which they then improvise (Downey 2002, 497). This case study's singers were disruptive in an important way: their deviations from collective decisions or emergent leaders were subjective and idiosyncratic, moving beyond an adherence to the music's rules or perceived improvisatory requirements. Singers' various, individual habits are, according to Sheets-Johnstone, "inscribed in the body as specific bodily dynamics" (Sheets-Johnstone 2009, 258). The variety of corporeal memories, or of entrained inscriptions on singers' voicing bodies, in amateur choral singing is considerable. That variety is all the more significant when improvisation results from the movement of those widely varying bodies. Gillian Siddall and Ellen Waterman write that the body is a site of resistance to training, through deviant "sonic and physical gestures that are often coterminous" (Siddall and Waterman 2016, 5). So, sounding bodies build a community; that community can help train bodies through

[9] This hypothesis is elaborated upon in great detail in Cox 2016, 11–57; musical motion is dealt with later (Cox 2016, 134–62).

 

embodied sound, but those bodies likewise disrupt the community. This cycle might be seen to create a positive feedback loop – not of a specific behaviour, but now of corporeal disruption.

## Conclusions: Complexity among voices and 'among discourses'

In the case study described in this article, singers from widely varying disciplinary backgrounds made unique, embodied contributions to an emergent creative community and to its audible outcomes. Complexity is useful in pinpointing how singers' interactions might yield these outcomes. More importantly, however, as Complexity arose among singers' reflections and the discourse produced by their qualitative data, a notion of embodied complexity emerged. In amateur aleatory choral performance, sounding bodies came to understand, and cultivate, both their own subjective creativity and the sound produced by the community through first-person corporeality and disruption.

Of course, if Complexity is to prove useful in understanding ensemble performance generally (as I emphatically propose it can), it will have to arise within a wider range of discourses and situations than that of amateur aleatory choral performance. The strong dynamic of interactivity, along with the indeterminate outcomes, of the aleatory music of this case study naturally lend themselves to being understood in terms of Complexity, and indeed offer a magnified view of emergence and proximity. Complexity might nevertheless also be used to understand how interaction occurs among participants in other kinds of ensemble performance. The growing body of research into ensemble dynamics is increasingly shedding light on how performers interact and how leadership and initiative are destabilised or distributed. Performance studies as a field has sought to understand lived experience and interaction in performance; as this case study begins to suggest, a concept of embodied complexity might be of use in this regard. Another concern of performance research is one of ontology and authorship. Complexity, used to frame the music according to how it is created from *within* the ensemble, might provide meaningful insight into how performers 'construct' works, assuming productive agency equal to that of the composer or musical leader.

This case study, however, cannot encompass such undertakings. The methodology at hand offers only a glimpse into singers' experiences, albeit a useful one. Questionnaires provide room for free, personal reflection, and enabled me to gather responses from a considerably broader range of singers than one-to-one interviews might. However, the data did not afford a longitudinal understanding of how musical knowledge and creativity emerge and are shared among performers. The data also did not allow me to probe singers' insights further in order to ensure that my impressions of their experiences matched their own. This shortcoming exposes two larger issues. The first is that this enquiry into the embodied nature of ensemble singing deductively reinforced my own preconceptions about corporeal interaction and interconnection in group singing. It is important to note, however, that this study was part of an ongoing project, in which this conviction had arisen from multiple experiences and conversations with singers. The second issue this case study must confront is that complexity may seem possible to apply in a facile way, since it is self-evident that performers interact with proximal colleagues, and that those interactions contribute to the audible musical performance. However, Complexity's strong commitment to the primacy of participants, its capacity to illuminate the intricate architecture of their interactions, and its destabilisation of centralised musical authority and authorship, offer considerable scope for reconceptualising performance.

It is amateur singers who most usefully open the door to this reconceptualisation. Given their disparate areas of knowledge, training, and lived experience, the singers in this case study have shown powerfully how creativity and agency operate within a musical community. Their voices create that community, which is made the more dynamic by the unique manner in which each participant corroborates or disrupts emergent patterns. Crucially, amateur

 

singers have shown how these collaborations occur via their voices; instead of relying exclusively on knowledge based in language, theory, and discussion, they have found interconnection and creative freedom that originates and resonates in their embodied, creative humanity.

## Acknowledgements

I would like to thank Prof Deborah Mawer and Howard Skempton of Royal Birmingham Conservatoire (Birmingham City University) and Dr Steve Halfyard, now of the Royal Conservatoire of Scotland. For methodological advice, feedback, and collaboration, I thank Kayleigh Nauman, Kathryn Emerson, and Gavin Thatcher. Above all, for their contributions to this research, I thank the singers, conductors, composers, and choir committees who participated in this project, especially Nicola Starkie, Benjamin Hamilton, and Stephen Hall, OBE. Finally, for initiating my interest in choral aleatorism, I thank composer James Oldham.

## References

Alhadeff-Jones, Michel. 2008. “Three Generations of Complexity Theories: Nuances and Ambiguities.” In *Complexity Theory and the Philosophy of Education*, edited by Mark Mason, 62–78. Chichester: John Wiley and Sons.

———. 2012. “Complexity, Methodology and Method: Crafting a Critical Process of Research.” *Complicity: An International Journal of Complexity and Education* 10.1, no. 2 (2012): 19–44. https://doi.org/10.29173/cmplct20398.

Andrew, Kerry. 2005. *O Nata Lux.* Unpublished.

Borgo, David. 2016. “Openness from Closure: The Puzzle of Interagency in Improvised Music and a Neocybernetic Solution.” In *Negotiated Moments: Improvisation, Sound, and Subjectivity*, edited by Gillian Siddall and Ellen Waterman, 113–30. Durham: Duke University Press.

Cardew, Cornelius. 1968–70. *The Great Learning.* London: Horace Cardew/Danny Dark Records.

Charmaz, Kathy. 2014. *Constructing Grounded Theory*, 2nd ed. London: Sage.

———. 1996. “The Search for Meaning: Grounded Theory.” In *Rethinking Methods in Psychology*, edited by Jonathan Smith, Rom Harré, and Luk Van Langenhove, 27–49. London: Sage.

Cohen, Louis, Lawrence Manion, and Keith Morrison. 2011. *Research Methods in Education*, 7th ed. London: Routledge.

Cox, Arnie. 2016. *Music and Embodied Cognition*. Bloomington: Indiana University Press.

Davis, Brent, and Dennis Sumara. 2006. *Complexity and Education: Inquiries into Learning, Teaching, and Research*. Mahwah, NJ: Lawrence Erlbaum Associates.

Davis, Tom. 2010. “Complexity as Process: Complexity-Inspired Approaches to Composition.” *Organised Sound* 15, no. 2 (August): 137–146. https://doi.org/10.1017/S1355771810000130.

Downey, Greg. 2002. “Listening to Capoeira: Phenomenology, Embodiment, and the Materiality of Music.” *Ethnomusicology* 46, no. 3 (autumn): 487–509. https://doi.org/10.2307/852720.

Galbreath, Daniel. 2019. “Conceptualising Choral Play: The Creative Experience of Aleatory Choral Music.” PhD thesis, Royal Birmingham Conservatoire, Birmingham City University.

Griffiths, Paul. 2001. “Aleatory.” In *Grove Music Online, Oxford Music Online*, 2nd ed. http://www.oxfordmusiconline.com/subscriber/article/grove/music/00509.

Hetherington, Lindsay. 2013. “Complexity Thinking and Methodology: The Potential of ‘Complex Case Study’ for Educational Research.” *Complicity: An International Journal of Complexity and Education* 10.1, no. 2: 71–85. https://doi.org/10.29173/cmplct20401.

 

Kuhn, Lesley. 2008. “Complexity and Educational Research: A Critical Reflection.” In *Complexity Theory and the Philosophy of Education*, edited by Mark Mason, 169–80. Chichester: John Wiley and Sons.

Laws, Kevin, and Robert McLeod. 2004. “Case Study and Grounded Theory: Sharing Some Alternative Qualitative Research Methodologies with Systems Professionals.” In *Proceedings of 22nd International Conference of the Systems Dynamics Society*, *Oxford, 2004*. http://sydney.edu.au/education_social_work/research/publications/2004.shtml#sthash.9WqVX89H.dpuf.

Radford, Mike. 2008. “Complexity and Truth in Educational Research.” In *Complexity Theory and the Philosophy of Education*, edited by Mark Mason, 137–49. Chichester: John Wiley and Sons.

Sheets-Johnstone, Maxine. 2009. *The Corporeal Turn: An Interdisciplinary Reader*. Exeter: Imprint Academic.

Siddall, Gillian and Ellen Waterman, eds. 2016. *Negotiated Moments: Improvisation, Sound, and Subjectivity*. Durham: Duke University Press.

Thatcher, Gavin and Daniel Galbreath. 2017. “Essai: The Singing Body: Towards a Unified Training of Voice, Body, and Mind.” *Theatre, Dance and Performance Training* 8, no. 3: 360–363. https://doi.org/10.1080/19443927.2017.1370268.

———. 2019. “Singing Bodies: Reconsidering and Retraining the Corporeal Voice.” *Theatre, Dance and Performance Training* 10, no. 3: 349–364. https://doi.org/10.1080/19443927.2019.1637370.

Thomaidis, Konstantinos and Ben Macpherson, eds. 2015. *Voice Studies: Critical Approaches to Process, Performance and Experience*. London: Routledge.

———. 2015. “Introduction: Voice(s) as a Method and an In-Between.” In *Voice Studies: Critical Approaches to Process, Performance and Experience*, edited by Konstantinos Thomaidis and Ben Macpherson, 3–7. London: Routledge.

Urquhart, Cathy. “An Encounter with Grounded Theory: Tackling the Practical and Philosophical Issues.” In *Qualitative Research in IS*, edited by Eileen M. Trauth, 104–40. Hershey, PA: Idea Group International.

 